

Design Consultants, Inc.

120 Middlesex Avenue
Somerville, MA 02145
(617) 776-3350

MEMORANDUM

DCI JOB NO. 2012-016

TO: Terry Smith, Traffic Eng.
Somerville Traffic and
Parking Department

FROM: William D. Carlson,
Senior Transportation Engineer

SUBJECT: **Traffic Impact Assessment**
Petra Somerville LLC - Rock Climbing/Fitness Center
10 Tyler Street, a/k/a 28 Park Street
Somerville, MA

DATE: March 29, 2012

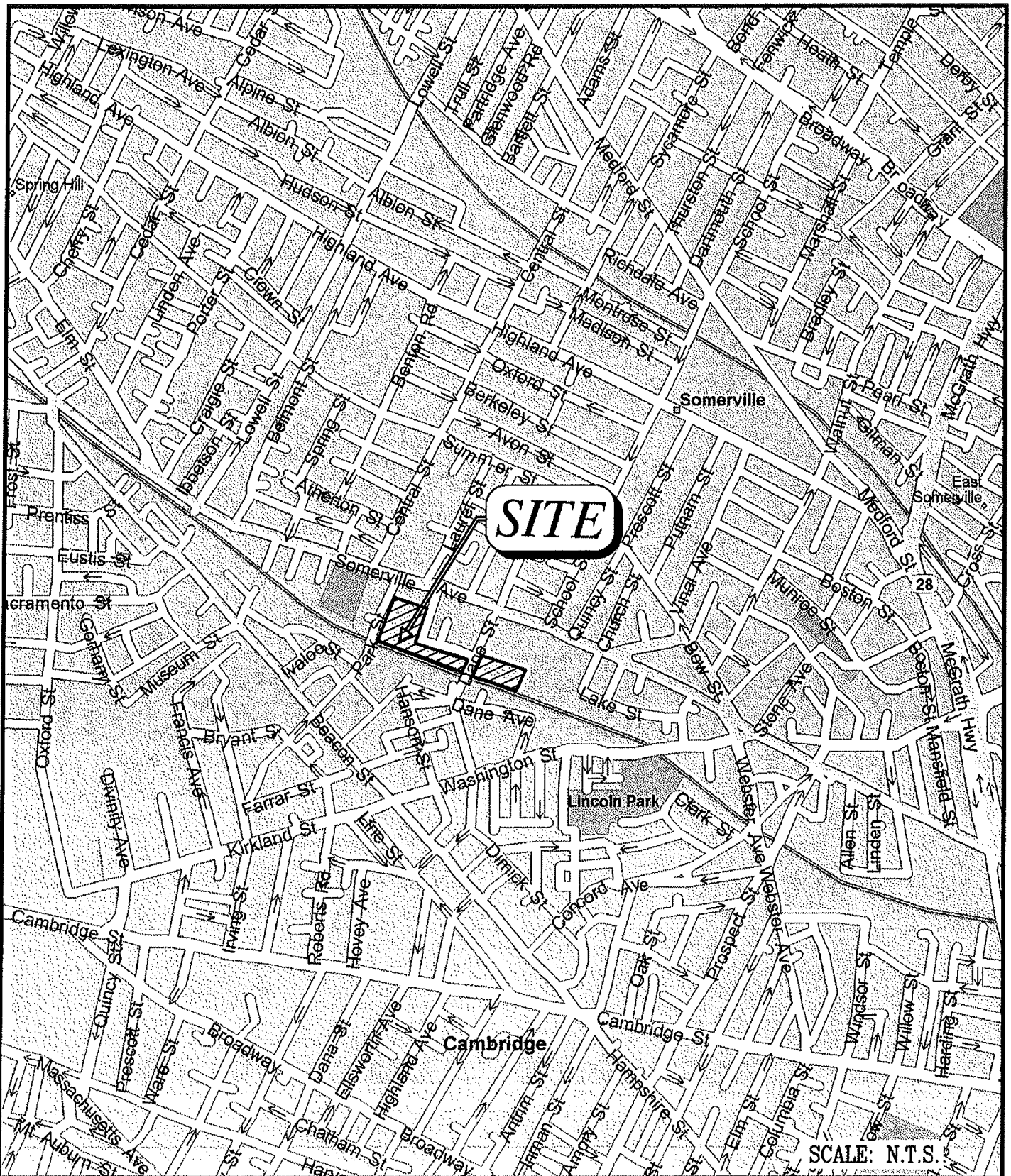
This memorandum, prepared at the request of Petra Somerville Inc, the applicant, evaluates the traffic impacts associated with a proposed Rock Climbing/Fitness Center, (herein referred to as the fitness center) to be located in Building #9 at 10 Tyler Street, a/k/a 28 Park Street, owned by JWF, LLC. Institute of Transportation Engineers (ITE) trip generation rates and standard traffic engineering practice and procedures have been used in this traffic assessment.

Building #9 was previously occupied by 43,467 SF of manufacturing use, 6,488 SF of office space and a 3,000 SF gym.

Proposed Development

Petra Somerville, Inc. proposes to construct a 30,480 square foot rock climbing/fitness center in building #9 at 10 Tyler Street a/k/a 28 Park Street. The entrance for the fitness center will be provided off of Properzi Way at Tyler Street. The fitness center will employ 5-10 people and business hour will be from 10 AM-11PM on weekdays and weekends. Bicycle racks for 40 bicycles will be provided inside the facility. Peak business hours are expected to occur from 5 PM -7 PM on weekdays and 11 AM - 3 PM on weekends.

PA2012 Projects\2012-016 Properzi Way Somerville\Draw\ENGINEERING\12-016 Traffic Study Figures.dwg 3/16/2012 8:25:52 AM EDT



Design Consultants, Inc.

Consulting Engineers and Surveyors

120 MIDDLESEX AVENUE, SUITE 20
SOMERVILLE, MA 02145
(617) 776-3350

21 PROPERZI WAY
SOMERVILLE, MA

LOCUS PLAN

FIGURE 1

The traffic assessment focused on only the afternoon peak hour as the fitness center will not be open during the morning peak hour.

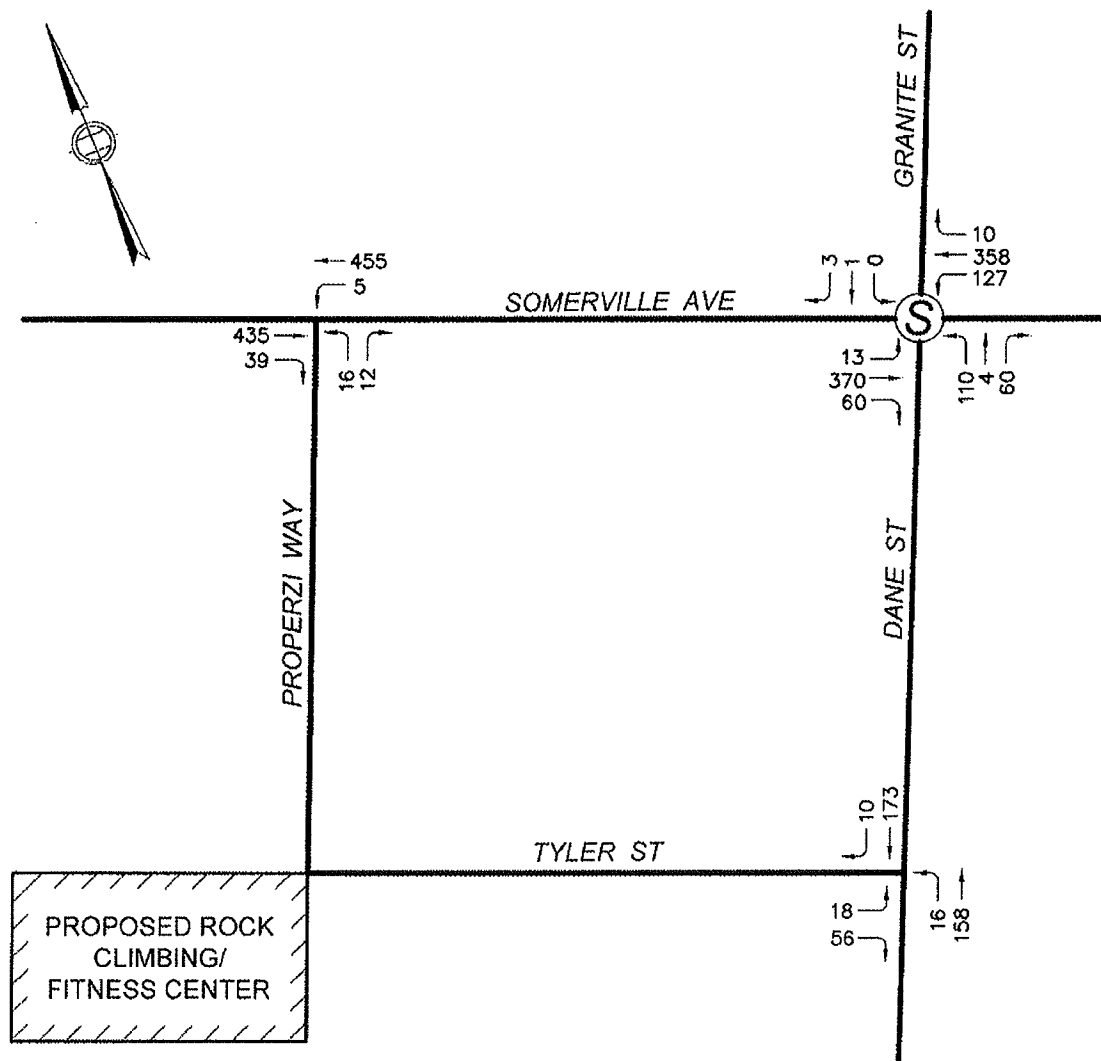
Properzi Way is a 26-foot wide, 2-way street travelling from Tyler Street to Somerville Avenue where it is stop sign controlled. Somerville Avenue at this location is 49 feet wide providing one travel lane in each direction, with bicycle lanes and curbside parking.

Tyler Street is also 26 feet wide travelling east west from Dane Street to Properzi Way is stop sign controlled at its intersections with Dane Street and Properzi Way. Dane Street is 26 feet wide at its intersection with Tyler Street providing one lane in each direction.

Dane Street is a north-south connector street travelling from Somerville Avenue to Washington Street. Dane Street is traffic signal controlled at its intersection with Somerville Avenue and Granite Street. Dane Street and Granite Street provide one lane approaches to their intersection with Somerville Avenue. Somerville Avenue provides one lane for eastbound traffic and a through lane and a left turn lane for westbound traffic.

Traffic Volumes

Manual turning movement counts were recorded by DCI from 4-6 PM at the study area intersections. The afternoon peak hour occurred from 4:30-5:30 and the PM peak hour volumes are shown below.



Trip Generation/Distribution

DCI has estimated the afternoon peak hour trips generated by the proposed fitness center by using trip rates presented in the ITE Trip Generation Manual.

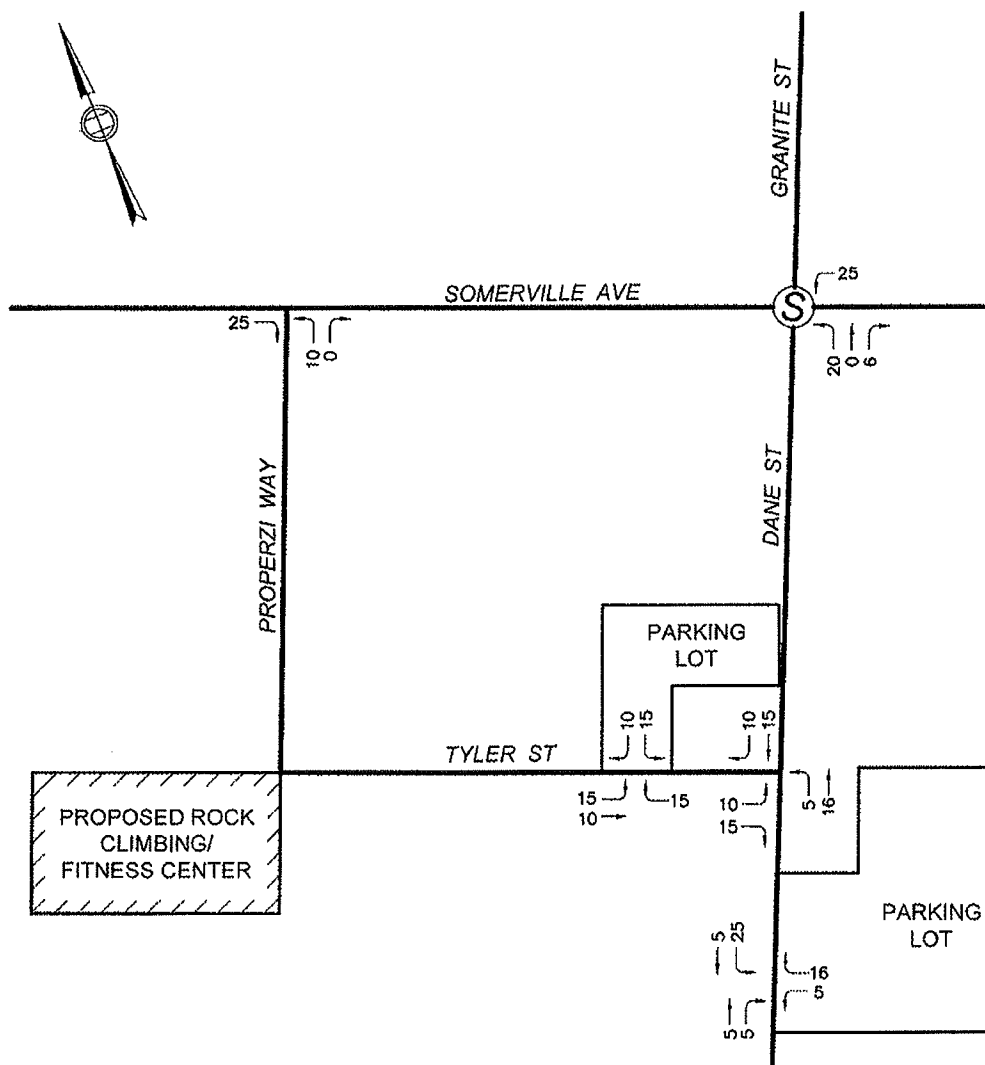
30,480 SF Health/Fitness Club (Land Use 492)

PM Peak Hour

- In - 60
- Out - 46
- Total - 106

Office use of the same space would generate significantly more trips during the AM peak hour and slightly more trips during the PM peak hour.

The site generated PM peak hour trips have been distributed on the study area intersections based upon existing travel patterns and knowledge of the study area and are shown below.



Traffic Impacts

In order to evaluate the traffic impacts of the site generated trips, it is necessary to determine Levels-of-Service for existing "No-Build" conditions and "Build" conditions with the new traffic from the fitness center. Level-of-Service is the standard technique used in traffic engineering to determine traffic flows through an intersection with "A" at best with little or no delays to "F" at worst or forced flow conditions. Detailed description of Levels-of-Service is provided in the Appendix.

Highway Capacity Software (HCS) was utilized in the capacity analyses to determine the resultant intersections Levels-of-Service for "No-Build" and "Build" conditions, which are shown in Table A.

As indicated in Table A, all No-Build Levels-of-Service will be maintained under "Build" conditions with only minimal increases in delays.

Therefore the PM peak hour trips generated by the proposed fitness center will have little, if any, impacts on traffic flows at the three study area intersections.

TABLE A
LEVEL-OF-SERVICE

Location/Movement	NO-BUILD				BUILD			
	V/C(1)	Delay(2)	LOS(3)	V/C	Delay	LOS		
Somerville Ave/Properzi Way								
Somerville Ave WB Lts	0	8.4	A	0	8.5	A		
Properzi Way Out	0.09	16.5	C	0.13	18.3	C		
Dane St./Tyler Street								
Dane NB Lts	0.01	7.6	A	0.02	7.7	A		
Tyler Street Out	0.11	10.2	B	0.15	10.8	B		
Somerville Ave/Dane Street (Signalized)								
Somerville Ave EB	0.59	24.5	C	0.59	24.5	C		
Somerville Ave WB Lts	0.26	10.5	B	0.31	11.1	B		
Somerville Ave WB	0.37	9.8	A	0.37	9.8	A		
Dane St NB	0.59	47	D	0.68	51.3	D		
Granite St SB	0.01	33.9	C	0.01	33.9	C		
Overall	0.61	21.6	C	0.66	22.7	C		

(1) Volume/Capacity Ratio

(2) Control delay in Seconds

(3) Levels-of-Service

APPENDIX

Health/Fitness Club (492)

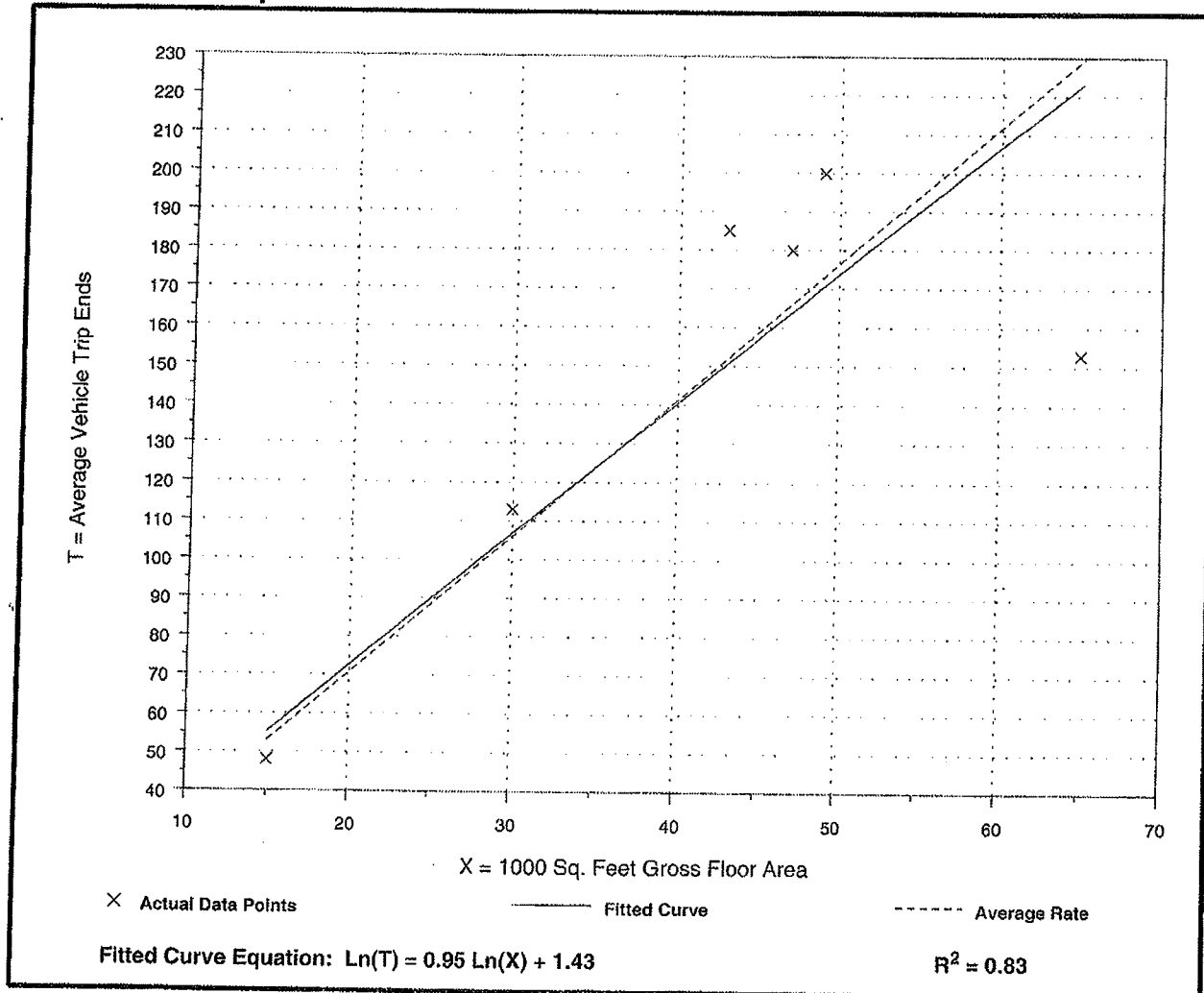
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Number of Studies: 6
Average 1000 Sq. Feet GFA: 42
Directional Distribution: 57% entering, 43% exiting

Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
3.53	2.35 - 4.30	2.00

Data Plot and Equation



TWO-WAY STOP CONTROL SUMMARY							
General Information			Site Information				
Analyst	WDC		Intersection	SOM/PROPERZI			
Agency/Co.	DCI		Jurisdiction	SOM			
Date Performed	3/1/2012		Analysis Year	2012			
Analysis Time Period	PM NB						
Project Description 21 PROPERZI							
East/West Street: SOM AVE			North/South Street: SOM				
Intersection Orientation: East-West			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street	Eastbound			Westbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	0	435	39	5	455	0	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate (veh/h)	0	483	43	5	505	0	
Proportion of heavy vehicles, P_{HV}	0	--	--	0	--	--	
Median type	Undivided						
RT Channelized?			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	16	0	12	0	0	0	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate (veh/h)	17	0	13	0	0	0	
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	0	
Percent grade (%)	0			0			
Flared approach		N			N		
Storage		0			0		
RT Channelized?			0			0	
Lanes	0	0	0	0	0	0	
Configuration		LR					
Control Delay, Queue Length, Level of Service							
Approach	EB	WB	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT	LR				
Volume, v (vph)		5	30				
Capacity, c_m (vph)		1051	344				
v/c ratio		0.00	0.09				
Queue length (95%)		0.01	0.28				
Control Delay (s/veh)		8.4	16.5				
LOS		A	C				
Approach delay (s/veh)	--	--	16.5				
Approach LOS	--	--	C				

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst		WDC			Intersection		DANE/TYLER	
Agency/Co.		DCI			Jurisdiction		SOM	
Date Performed		3/2/2012			Analysis Year		2012	
Analysis Time Period		PM NB						
Project Description 21 PROPERZIE								
East/West Street: TYLER					North/South Street: DANE			
Intersection Orientation: North-South					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	16	158	0	0	173	10		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	17	175	0	0	192	11		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	0	0	0	18	0	56		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	0	0	0	20	0	62		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	17						82	
C (m) (vph)	1381						769	
v/c	0.01						0.11	
95% queue length	0.04						0.36	
Control Delay	7.6						10.2	
LOS	A						B	
Approach Delay	--	--				10.2		
Approach LOS	--	--				B		

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HCS2000™ DETAILED REPORT												
General Information							Site Information					
Analyst WDC Agency or Co. DCI Date Performed 3/2/2012 Time Period PM NB							Intersection SOM/DANE Area Type CBD or Similar Jurisdiction SOM Analysis Year 2012 Project ID 21PROPERZI					
Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	1	0	1	1	0	0	1	0	0	1	0
Lane group		LTR		L	TR			LTR			LTR	
Volume, V (vph)	13	370	60	127	358	10	110	4	60	0	1	3
% Heavy vehicles, %HV	0	0	0	0	0	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, I_i		2.0		2.0	2.0			2.0			2.0	
Extension of effective green, e		2.0		2.0	2.0			2.0			2.0	
Arrival type, AT		3		3	3			3			3	
Unit extension, UE		3.0		3.0	3.0			3.0			3.0	
Filtering/metering, I		1.000		1.000	1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0		10.0	11.0			12.0			12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0			0			0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		
Phasing	WB Only	EW Perm	03	04	NS Perm	06	07	08				
Timing	$G = 20.0$	$G = 60.0$	$G =$	$G =$	$G = 30.0$	$G =$	$G =$	$G =$				
	$Y = 0$	$Y = 5$	$Y =$	$Y =$	$Y = 5$	$Y =$	$Y =$	$Y =$				
Duration of Analysis, $T = 0.25$			Cycle Length, $C = 120.0$									
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		492		141	409			193			4	
Lane group capacity, c		827		541	1097			329			384	
v/c ratio, X		0.59		0.26	0.37			0.59			0.01	
Total green ratio, g/C		0.50		0.67	0.67			0.25			0.25	

TWO-WAY STOP CONTROL SUMMARY							
General Information			Site Information				
Analyst	WDC		Intersection	SOM/PROPERZI			
Agency/Co.	DCI		Jurisdiction	SOM			
Date Performed	3/7/2012		Analysis Year	2012			
Analysis Time Period	PM build						
Project Description 21 PROPERZI							
East/West Street: SOM AVE			North/South Street: SOM				
Intersection Orientation: East-West			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street	Eastbound			Westbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	0	435	64	5	455	0	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate (veh/h)	0	483	71	5	505	0	
Proportion of heavy vehicles, P_{HV}	0	--	--	0	--	--	
Median type	Undivided						
RT Channelized?			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR	LT			
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	26	0	12	0	0	0	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly Flow Rate (veh/h)	28	0	13	0	0	0	
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	0	
Percent grade (%)	0			0			
Flared approach		N			N		
Storage		0			0		
RT Channelized?			0			0	
Lanes	0	0	0	0	0	0	
Configuration		LR					
Control Delay, Queue Length, Level of Service							
Approach	EB	WB	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
Volume, v (vph)		5		41			
Capacity, c_m (vph)		1026		312			
v/c ratio		0.00		0.13			
Queue length (95%)		0.01		0.45			
Control Delay (s/veh)		8.5		18.3			
LOS		A		C			
Approach delay (s/veh)	--	--	18.3				
Approach LOS	--	--	C				

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	WDC			Intersection	DANE/TYLER			
Agency/Co.	DCI			Jurisdiction	SOM			
Date Performed	3/7/2012			Analysis Year	2012			
Analysis Time Period	PM build							
Project Description 21 PROPERZIE								
East/West Street: TYLER				North/South Street: DANE				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume	21	174	0	0	188	20		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	23	193	0	0	208	22		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Westbound			Eastbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume	0	0	0	28	0	71		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR	0	0	0	31	0	78		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	23						109	
C (m) (vph)	1350						725	
v/c	0.02						0.15	
95% queue length	0.05						0.53	
Control Delay	7.7						10.8	
LOS	A						B	
Approach Delay	--	--				10.8		
Approach LOS	--	--				B		

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HCS2000™ DETAILED REPORT												
General Information						Site Information						
Analyst WDC						Intersection SOM/DANE						
Agency or Co. DCI						Area Type CBD or Similar						
Date Performed 3/7/2012						Jurisdiction SOM						
Time Period PM BD						Analysis Year 2012						
						Project ID 21PROPERZI						
Volume and Timing Input												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_i	0	1	0	1	1	0	0	1	0	0	1	0
Lane group		LTR		L	TR			LTR			LTR	
Volume, V (vph)	13	370	60	152	358	10	130	4	66	0	1	3
% Heavy vehicles, %HV	0	0	0	0	0	0	0	0	0	0	0	0
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or actuated (A)	P	P	P	P	P	P	P	P	P	P	P	P
Start-up lost time, l_i		2.0		2.0	2.0			2.0			2.0	
Extension of effective green, e		2.0		2.0	2.0			2.0			2.0	
Arrival type, AT		3		3	3			3			3	
Unit extension, UE		3.0		3.0	3.0			3.0			3.0	
Filtering/metering, I		1.000		1.000	1.000			1.000			1.000	
Initial unmet demand, Q_b		0.0		0.0	0.0			0.0			0.0	
Ped / Bike / RTOR volumes	0		0	0		0	0		0	0		0
Lane width		12.0		10.0	11.0			12.0			12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking maneuvers, N_m												
Buses stopping, N_B		0		0	0			0			0	
Min. time for pedestrians, G_p	3.2			3.2			3.2			3.2		
Phasing	WB Only	EW Perm	03	04	NS Perm	06	07	08				
Timing	G = 20.0	G = 60.0	G =	G =	G = 30.0	G =	G =	G =				
	Y = 0	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =				
Duration of Analysis, T = 0.25						Cycle Length, C = 120.0						
Lane Group Capacity, Control Delay, and LOS Determination												
	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v		492		169	409			221			4	
Lane group capacity, c		827		541	1097			327			384	
v/c ratio, X		0.59		0.31	0.37			0.68			0.01	
Total green ratio, g/C		0.50		0.67	0.67			0.25			0.25	

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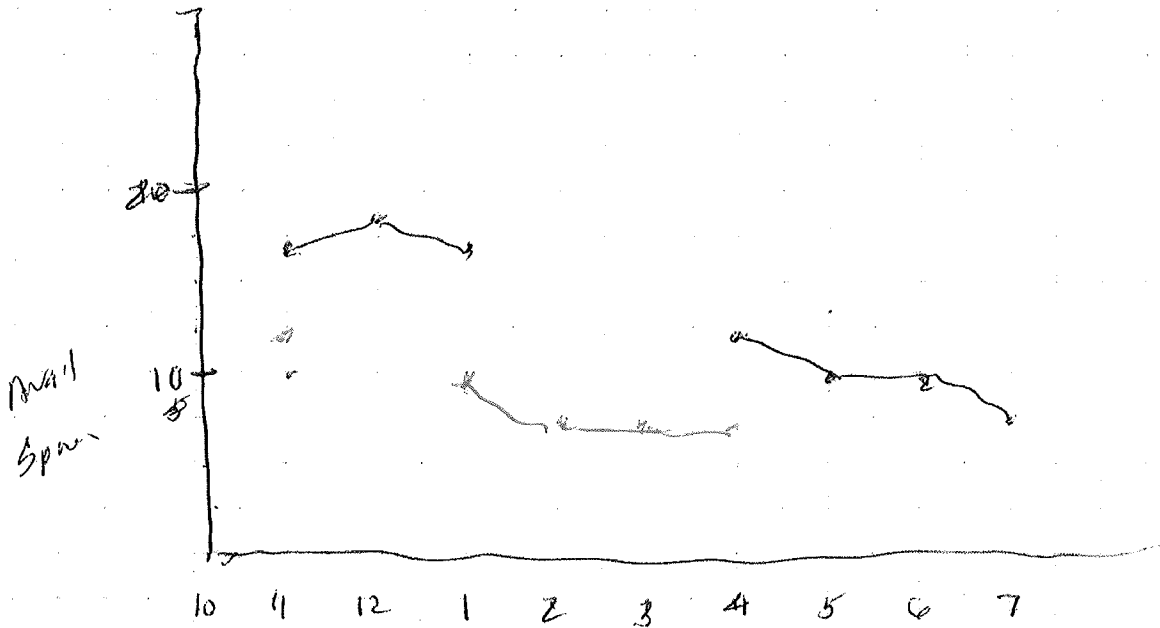
JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____



Time of Day

Wet/dry ---

Snow